303 686 4302

# OPERATORS' MANUAL

for

Monroe Electronics, Inc.
Model 272
Portable Surface Resistivity/
Resistance Meter

Series

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

Version

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 0 | 1 | 3 | 9 | - | 1 | . | 0 | C |

Set gain to 5.0 when using the two bar probe.

Set gain to 10.0 when using circular probe.

Monroe Electronics, Inc.
100 Housel Avenue
Lyndonville, NY 14098

Tel. (716) 765-2254
Fax. (716) 765-9330

Printed in USA

P/N 0340078

## WARRANTY

Monroe Electronics, Inc., warrants to the Owners, each instrument and sub-assembly manufactured by them to be free from defects in material and workmanship for a period of one year after shipment from the factory. This warranty is applicable to the original purchaser only.

Liability under this warranty is limited to service, adjustment or replacement of defective parts (other than tubes, fuses or batteries) on any instrument or sub-assembly returned to the factory for this purpose, transportation prepaid.

This warranty does not apply to instruments or sub-assemblies subjected to abuse, abnormal operating conditions, or unauthorized repair or modification.

Since Monroe Electronics, Inc. has no control over conditions of use, no warranty is made or implied as to the suitability of our product for the customer's intended use.

THIS WARRANTY SET FORTH IN THIS ARTICLE IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESS, IMPLIED OR STATUTORY INCLUDING BY NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. Except for obligations expressly undertaken by Monroe Electronics, in this Warranty, Owner hereby waives and releases all rights, claims and remedies with respect to any and all guarantees, express, implied, or statutory (including without limitation, the implied warranties of merchantability and fitness), and including but without being limited to any obligation of Monroe Electronics with respect to incidental or consequential damages, or damages for loss of use. No agreement or understanding varying or extending the warranty will be binding upon Monroe Electronics unless in writing signed by a duly authorized representative of Monroe Electronics.

In the event of a breach of the foregoing warranty, the liability of Monroe Electronics shall be limited to repairing or replacing the non-conforming goods and/or defective work, and in accordance with the foregoing, Monroe Electronics shall not be liable for any other damages, either direct or consequential.

MONROE ELECTRONICS, INC.
100 HOUSEL AVENUE
LYNDONVILLE, NEW YORK 14098
PHONE 716-765-2254

Digitized by the Internet Archive
in 2026

https://archive.org/details/manualsplus_12018

# MODEL 272

# PORTABLE SURFACE RESISTIVITY/ RESISTANCE METER

## INTRODUCTION:

The Monroe Electronics Model 272 Portable Surface Resistivity/Resistance Meter provides fast repeatable measurements of both surface resistivity and resistance to ground in one versatile instrument. Its improved accuracy and digital readout make it ideal for checking and evaluating static control products such as static dissipative bags, mats and work surfaces and resistance of work surfaces to ground. The Model 272's convenient size, portability and rugged construction make this meter ideally suited for applications in a manufacturing environment.

## FEATURES:

- Measures both surface resistivity and resistance to ground
- Easy to use - autozero - no adjustments required
- Portable - uses rechargeable battery for 8 hours continuous use
- Improved accuracy - ± 0.1 decade with digital readout
- Guarded ring electrode weighing 5 pounds conforms to standards
- Wide range of direct readings in ohms per square (Ω/▪) for surface resistivity or ohms (Ω) for resistance to ground
- Switch selectable measuring voltage - 10 volts below 10E12 range or 100 volts above 10E5 range
- Displays value in scientific notation or 3-place log

## MODEL 272 SPECIFICATIONS:

| | |
|---|---|
| RANGE: | Automatic from 10E4 to 1.0 x 10E13 Ω or 10E5 to 1.0 x 10E14 Ω/▪ |
| ACCURACY: | ±0.1 decade (typical) |
| MEASURING VOLTAGE: | 10 volts for 10E4 through 10E11 + Ω or 10E5 through 10E12 + Ω/▪ and 100 volts for 10E5 through 10E12 + Ω or 10E6 through 10E13 + Ω/▪ |
| DISPLAY: | 16x1 LCD alpha/numeric display will show:<br>Operation mode - Ω or Ω/▪<br>Readings in log or scientific notation<br>Applied voltage<br>Low battery<br>Also used in SETUP mode and during calibration |
| POWER: | Rechargeable battery with 100 VAC, 120 VAC or 230 VAC adapter/charger supplied. Battery operation up to 8 hours continuous use |

ELECTRODE: Guarded ring electrode recommended by ASTM D-257 weighing five pounds (2.7kg). The outer electrode is a ring having an inside diameter of 2.25 inches 5.72cm) and a width of 0.125 inches 0.32cm). The inner electrode is a disc with an outside diameter of 1.2 inches (3.05cm). The electrode assembly is separate from the meter and is connected to the meter by a cable 3 feet (91.44cm) in length.

DIMENSIONS: Electrode - overall height 4.0 inches (10.2cm)
outside diameter - 3.0 inches (7.6cm)

Meter - height 2.5 inches (6.4cm)
width 6.0 inches (15.2cm)
depth 6.0 inches (15.2cm)

Carrying case - height 6.5 inches (16.5cm)
width - 7.0 inches (17.8cm)
depth - 6.5 inches (16.5cm)

## HOW MODEL 272 WORKS:

On the insulating base of the electrode assembly are two concentric circular electrodes of slightly compressive conductive elastomeric material. The dimensions of these rings are such that when the assembly is placed on the flat surface of the material to be tested, ten squares of the material lie between the electrodes.

When power is switched on a voltage is impressed on the outer ring and current flow in the interposed material is detected by the inner electrode thus defining the resistivity characteristics of the material. Internal circuitry of the Model 272 interprets this signal and provides a direct readout of the surface resistivity of the material under test in ohms per square. (Re. ASTM D-257, para. 3.5)

In the resistance to ground mode, the test voltage is completely removed from the outer electrode and is applied to ground via a test lead supplied with the instrument. Current flowing between ground and the inner sensing electrode is detected and is converted to a direct readout of the resistance of the intervening path in ohms.

## CAUTION

## DO NOT TOUCH ELECTRODES

1. Electrodes will become contaminated with skin oils.

2. When in operation, electrodes may be operating at a potential of 100 volts and are capable of delivering an annoying shock to the person touching them. Although the current capability is limited, a distinct hazard exists in the person's reaction to the shock.

**BATTERY OPERATION:**

Model 272 was designed to operate continuously on its internal battery when fully charged. A battery symbol will flash in the display when the battery needs recharging.

To conserve battery power, the unit was shipped from the factory with its battery shutdown timer set for five minutes. This means that after five minutes of use (or non-use) the instrument will shut itself off. The timer is reset simply by pressing the ON-OFF switch. The default value may also be changed in software in the SETUP mode (described later). Optional default values are: 5 min., 10 min., 30 min. and NONE.

Model 272 may also be line operated regardless of the state of its internal battery, although significant errors may be introduced in this mode. In the event the battery is fully charged, the charge rate is reduced to float the battery. The timeout feature is disabled while the charger is plugged in.

How to set up →

**CONFIDENCE CHECK:**

As shipped from the factory, the default settings for the Model 272 are to measure surface resistivity using the probe provided at an applied voltage of ten volts and to display the result in scientific notation similar to that shown below:

```
1.2E10 Ω/■ @10 V
```

To demonstrate this, connect the probe to the Model 272 by attaching the coaxial plug to the mating connector on the front panel and inserting the miniature banana plug into the jack directly above. Included with the Model 272 is a Specimen Support Surface -- a metal plate with an insulative surface -- and a cable with banana plugs on each end. Connect this cable between the hole on the side of the plate and the metallic jack on the side of the Model 272. Place an ordinary sheet of common notepad paper on the insulative surface of the plate and set the probe on top of the paper. Press the ON-OFF switch. A brief announcement will appear on the screen and, if the factory settings have not been disturbed, the message shown above will be displayed within a few seconds. The value will probably be different. Common paper generally will have a resistivity within the range of the instrument under normal ambient conditions allowing some value to be displayed.

The above illustrates how the display reacts to a resistivity measurement wherein the applied voltage is impressed across the material (or lack of material) between the circular electrodes of the probe and the Model 272 interprets a factor specific to the probe to produce a correct value readout in ohms per square.

Now, lift the probe by its handle. An error message should be displayed:

```
VALUE TOO HIGH
```

## OPERATING CONTROLS:

In addition to the ON-OFF pushbutton switch, there are two other operator controls -- pushbutton switches labeled OHMS-OHMS/SQ and 10V-100V. These may be used to temporarily toggle the function or the applied voltage. Once the instrument is shut off or powered down automatically, the power-up default settings are restored.

## RESISTANCE TO GROUND:

The method of measurement of surface resistivity was given in "CONFIDENCE CHECK".

To make a measurement of resistance from a surface to a ground point, connect the jack labeled "OHMS" to the ground point, set the electrode on the surface and switch to the "OHMS" mode.

## PROGRAMMING:

Power up default settings may be re-programmed in the SETUP MODE. Options are as shown below where the factory default is the first shown in the lists:

| OBJECTIVE | OPTION |
|---|---|
| DISPLAY | SCI<br>LOG |
| FUNCTION | Ω/▪<br>OHMS |
| V SOURCE | 10V<br>100V |
| AUTO OFF | 5 MIN<br>10 MIN<br>30 MIN<br>NONE |
| PROBE GAIN | * (see below) |
| RESET ALL | NO<br>YES |

To invoke the SETUP MODE, start with the instrument OFF. Press and hold the OHMS OHMS/SQ pushbutton while switching power ON. The message "SETUP MODE" will be displayed very briefly and then the message "DISPLAY SCI" will appear. To alter the option, press the OHMS-OHMS/SQ pushbutton. To scroll the objectives, press the 10V-100V pushbutton.

* The PROBE GAIN options are 0.1 through 25.5 in increments of 0.1. Gain is factory preset for the probe which accompanies the Model 272. PROBE GAIN SHOULD NOT BE CHANGED INDISCRIMINATELY IN THE FIELD.

Please note that the timeout feature is disabled in the setup mode and that if the battery voltage falls to a low value during programming, any newly selected options will be lost.

At the RESET ALL objective, a NO response will accept any new power-up options and return to the operational mode using the new options. A YES response will reset any changes and return to the top of the list (DISPLAY SCI).

A LOG display, the equivalent of the SCI display shown on Page 3 would be:

| 1Ø.Ø79 Ω/▪ @1Ø V |
|---|

where 10.079 is the common log value of the 12 gigaohm per square input, not literally 10.079 ohms per square.

**ERROR MESSAGES:**

In addition to the flashing battery symbol which indicates the need for battery charging, any of several other error messages may appear on the screen:

| MESSAGES | MEANING |
|---|---|
| ERROR MESSAGE 1: VALUE TOO LOW or ERROR MESSAGE 2: VALUE TOO HIGH | Measured value beyond specified range of instrument, probe disconnected or incorrect measurement mode. |
| ERROR MESSAGE 3: CANNOT AUTOZERO | Analog circuitry malfunction. |
| ERROR MESSAGE 4: SUPPLY TOO LOW | Measuring voltage supply out of regulation due to overload. |
| ERROR MESSAGE 5: PLEASE CHARGE ME | Measuring voltage out of regulation due to low battery. Charge battery. Model 272 will operate on charger. |

## MAINTENANCE TIPS:

The case of the Model 272 and the painted surfaces of its probe may be cleaned using a soft cloth saturated with a solution of warm water and a small amount of mild detergent and wrung out. Care should be taken not to get detergent solution inside of or on any part of the base of the probe.

The contact electrodes should be cleaned whenever any accumulation of contaminants is noted as foreign materials on the faces may cause higher than normal indications. These parts should be cleaned by spraying with FREON® T-P 35 Solvent available as stock number MS-160/CO2 from Miller Stevenson Chemical Co., Inc., George Washington Highway, Danbury, CT 06810 (203) 743-4447

# RETURN POLICIES AND PROCEDURES

## FACTORY REPAIR:

Return authorization is required for factory repair work. Material being returned to the factory for repair must have a *Return Material Authorization* number. To obtain an RMA number, call 716-765-2254 and ask for Customer Service.

Material returned to the factory for warranty repair must be accompanied by a copy of a dated invoice or bill of sale, which serves as a proof of purchase for the material.

Repairs will be returned promptly. Repairs are normally returned to the customer by UPS within ten working days after receipt by Monroe Electronics, Inc. Return (to the customer) UPS charges will be paid by Monroe Electronics on warranty work. Return (to the customer) UPS charges will be prepaid and added to invoice for out-of-warranty repair work.

## EXPEDITED FACTORY REPAIR:

All material returned to the factory by air or by an overnight service will be expedited. Expedited factory repairs will be returned to the customer by the same mode of transportation by which the material was returned to the factory for repair (i.e., material returned to the factory by an overnight service will be returned to the customer by an overnight service).

NOTE: Return (to the customer) transportation expenses for expedited factory repairs will always be at the expense of the customer despite the warranty status of the equipment.

## FACTORY REPAIRS TO MODIFIED EQUIPMENT:

Material returned to the factory for repair that has been modified will be not tested unless the nature and purpose of the modification is understood by us and does not render the equipment untestable at our repair facility. We will reserve the right to deny service to any modified equipment returned to the factory for repair regardless of the warranty status of the equipment.

# WARRANTY

Monroe Electronics, Inc., warrants to the Owners, each instrument and sub-assembly manufactured by them to be free from defects in material and workmanship for a period of one year after shipment from the factory. This warranty is applicable to the original purchaser only.

Liability under this warranty is limited to service, adjustment or replacement of defective parts (other than tubes, fuses or batteries) on any instrument or sub-assembly returned to the factory for this purpose, transportation prepaid.

This warranty does not apply to instruments or sub-assemblies subjected to abuse, abnormal operating conditions, or unauthorized repair or modification.

Since Monroe Electronics, Inc. has no control over conditions of use, no warranty is made or implied as to the suitability of our product for the customer's intended use.

THIS WARRANTY SET FORTH IN THIS ARTICLE IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESS, IMPLIED OR STATUTORY INCLUDING BY NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. Except for obligations expressly undertaken by Monroe Electronics, in this Warranty, Owner hereby waives and releases all rights, claims and remedies with respect to any and all guarantees, express, implied, or statutory (including without limitation, the implied warranties of merchantability and fitness), and including but without being limited to any obligation of Monroe Electronics with respect to incidental or consequential damages, or damages for loss of use. No agreement or understanding varying or extending the warranty will be binding upon Monroe Electronics unless in writing signed by a duly authorized representative of Monroe Electronics.

In the event of a breach of the foregoing warranty, the liability of Monroe Electronics shall be limited to repairing or replacing the non-conforming goods and/or defective work, and in accordance with the foregoing, Monroe Electronics shall not be liable for any other damages, either direct or consequential.

MONROE ELECTRONICS, INC.
100 HOUSEL AVENUE
LYNDONVILLE, NEW YORK 14098
PHONE 716-765-2254

MP MASTER
MA21744